

Notice of Allowability

Application No.

09/922,442

Examiner

Matthew W. Genack

Applicant(s)

LIANG ET AL.

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 17 August 2007.
2. ☒ The allowed claim(s) is/are 11, 14 and 17.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


DUC M. NGUYEN
SUPERVISORY PRIMARY EXAMINER
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DETAILED ACTION

Allowable Subject Matter

1. Claims 11, 14, and 17 are allowed.

Regarding Claims 11 and 14, Dogan *et. al.*, U.S. Patent No. 6,018,317, discloses a method for generating transmit beamformer weight vectors (that is, downlink beamformer weight vectors) for use by a base station antenna array in communications with multiple user stations (Abstract, Column 23 Lines 60-65, Fig. 5), whereby the uplink signals and downlink signals are at separate frequencies (Column 23 Lines 42-51). The combination of received uplink signals are used to compute uplink beamforming weight vectors for each user station (Column 4 Lines 24-35, Column 22 Lines 20-34, Column 58 Lines 1-30, Figs. 1-3 and 30). The directivity pattern, wherein every angle has a gain (thus determining the nulls and the main beam location) and phase associated with it, of each signal is recovered from the uplink beamforming weight vector (Column 10 Line 22 to Column 11 Line 14, Column 50 Lines 8-22, Column 53 Lines 28-35). Receive nulls (that is, uplink nulls) are used to create transmit nulls (that is, downlink nulls) (Column 63 Line 63 to Column 64 Line 3). A transmit weight vector (that is, a downlink weight vector) is generated based on the directivity pattern (which includes the nulls); the downlink beamforming weight vectors are used to modify an information signal, which is then sent to the array to be transmitted (Column 32 Lines 32-59, Column 73 Line 58 to Column 74 Line 4).

Dogan *et. al.* does not expressly disclose the practice of scaling the phases of the uplink pattern nulls according to a factor, said factor equal to the ratio of the downlink operating frequency to the uplink operating frequency, in order to arrive at the values of the phases of the respective downlink pattern nulls.

Dent, U.S. Patent No. 5,555,257, discloses the practice of scaling the relative phases of antenna array element signals according to a factor that is related to the ratio of the uplink wavelength to the downlink wavelength (wavelength being inversely proportional to frequency, and therefore, the ratio of uplink wavelength to downlink wavelength is equal to the ratio of downlink frequency to uplink frequency), (Column 30 Lines 50-56) in the context of cellular/satellite communication systems (Abstract).

Dogan *et. al.* does not expressly disclose the practice of using the aforementioned phases of respective downlink pattern nulls in the construction of the downlink pattern nulls, whereby each null is constructed from one of said phases and a corresponding amplitude, and using these downlink nulls, along with the antenna spacing, in a polynomial for constructing the downlink beamforming weight vector.

Claim 17 depends on Claim 14, and is therefore allowable over the prior art.

EXAMINER'S AMENDMENT

2. An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

- Claim 11 has been renumbered as Claim 1.
- Claim 14 has been renumbered as Claim 2.
- Claim 17 has been renumbered as Claim 3.

Response to Arguments

3. Applicant's arguments, filed 19 June 2007, with respect to the 35 USC 103(a) rejections of Claims 11 and 14 have been fully considered and are persuasive. Said rejection has been withdrawn.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew W. Genack whose telephone number is 571-272-7541. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc Nguyen can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew Genack

Examiner

TC-2600, Division 2617



28 September 2007



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